

12 Technical Document

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RHYTHM Product Development™

The intelligent Product Development Solutions

Statement of Direction

Abstract

Product Development is a critical function within the enterprise. In today's winner-take-all marketplace, companies must make the best use of their resources-- from financial resources to human resources. Maximizing these resources, while at the same time meeting market and customer needs, is a challenging task.

i2's RHYTHM Product Development suite is a comprehensive and integrated software solution that provides intelligent decision-making support during the product development process. RHYTHM Product Development applies advanced optimization techniques to the entire product life cycle-- from concept to launch to phase out. The RHYTHM Product Development solution is part of i2's Business Process Optimization (BPO) solutions, which enable customers to dramatically increase their decision-making power across the enterprise; enable complex, multi-enterprise collaboration; and support eBusiness initiatives with intelligent automation.

This document outlines i2's strategy for addressing every piece of the product development function of an organization. The first section of this document discusses i2's overall strategy in Business Process Optimization (BPO). Section 2 outlines the issues companies face today to manage the product development process. The next section highlights the various activities associated with product development. Section 4 introduces RHYTHM Product Development and outlines i2's direction in providing a comprehensive product development solution.

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1. Introduction to i2 Technologies

i2's Business Process Optimization (BPO) solutions enable customers to dramatically increase their decision-making power across the enterprise; enable complex, multi-enterprise collaboration; and support their eBusiness initiatives with intelligent automation. i2's full suite of software, RHYTHM®, is used by hundreds of companies around the world in a wide range of industries, and represents the answer for optimal decision making across the enterprise.

RHYTHM is built around a critical need in companies today: velocity. Why is velocity critical? Velocity means the velocity of producing and moving goods, the velocity of planning, and the velocity of responsiveness to the marketplace. RHYTHM represents the high-value solution for enabling velocity in every area of the business. High-velocity enterprises drive out inefficiency, achieve maximum responsiveness to customer demand, and attain competitive advantage.

The latest enhancements to RHYTHM represent a natural extension of i2's strengths in supply chain management:

- **Multi-enterprise e-Business collaboration**

Extended via the internet, RHYTHM enables a powerful e-business solution.

In order to thrive in a winner-take-all business environment, the high-velocity organization must be able to connect, communicate, and collaborate with customers, partners, and suppliers. RHYTHM has responded to this critical necessity with a family of products that support interactive business operations across multiple enterprises. An example of such inter-company cooperation is collaborative planning, joint forecasting, and reconciliation demand and supply between a manufacturer, and its suppliers and customers. The primary benefit of these collaborative arrangements is that businesses can respond swiftly to changes in their business ecosystems.

- **Extending decision-making power across all the core processes of the enterprise.**

i2 has recognized that the high-velocity enterprise must make intelligent decisions in every area of the business to maintain competitive thrust. Responding to this, the new RHYTHM solution addresses the fundamental business functions: Product Development, Supply Chain Management, Sales and Marketing, Customer Service, Financial Management, and Workforce Management. RHYTHM applications and decision-support architecture enable consistent planning and decision making across all business processes.

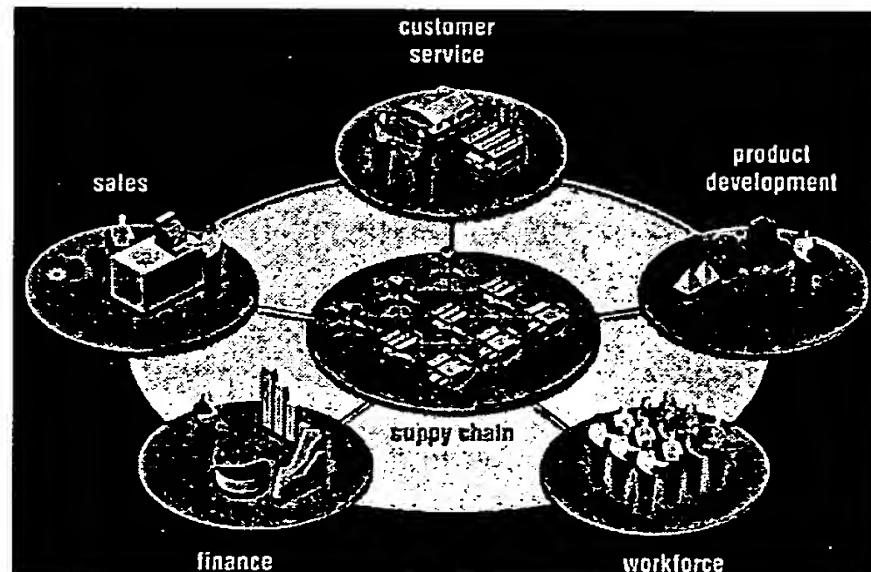


Figure 1 Core Business Processes within an Enterprise

Product Development is one of the key functions of an organization. Managing the entire product life cycle is a critical organizational objective. This document discusses i2 Technologies' strategy on Product Development.

2. Today's Product Development – Tougher Choices and Decisions

Product Development is a highly risky, yet critical, function within an enterprise. Companies invest large amounts of money in product development to introduce products that will define the future of their organizations. Investing in right products and bringing these products to market is critical to any company's long-term success. New products drive corporate revenue, market share, and stock price.

In today's business environment, companies face increasing pressure to develop new products and to develop them at an unrelenting pace. Product innovation has become a challenging task. Managers have to sort through mountains of information, incorporate rapidly changing market conditions, and make intelligent decisions. The speed and complexity of product development have increased.

2.1 Product Development – High Speed and Complexity

Rapid technological advances, changing consumer needs, shorter product life cycles, increasing competition, and information overload are a few reasons for the increased speed and complexity of innovation.

- **Rapid technological advancement:** Evolving technology and increasing knowledge base are making possible solutions and products that were nothing but dreams a few years ago. What was science fiction yesterday – for example, hand-held computers and voice recognition products – is suddenly a technological reality today. As a result, new products with sophisticated designs are being introduced rapidly.
- **Changing consumer needs:** As consumers, we witness more and more dazzling products in the marketplace. As a result, our demands for new product innovations escalate, fueling the growth and complexity of product development. We are like kids in a candy shop – we envision the glitter of new products, and we demand them now.
- **Shorter product life cycles:** One result of rapid technological advancement, coupled with increasing customer demands, is shorter product life cycles. Products that lasted five or ten years are now being replaced every year or every few months by competitive products. Companies have to introduce new products and they must do so very rapidly or risk losing market share to competition.
- **Global Competition:** Another result of technological advancement has been the globalization of the world economy. Companies in different geographic areas now have access to different markets across the globe. New products have to be produced at the lowest possible cost by maximizing available resources.
- **Information Overload:** Rapid technological improvement and the new information age have resulted in the well-known phenomenon of "information overload". Managers, while making tough decisions, often struggle to sift through the massive volume of information available to them.

The end result of all these factors is that the product development process has become ever more complex and new products have to be developed at much higher pace. Furthermore, cross-functional integration of many different types of resources, across both inter- and intra-enterprise, is a critical necessity.

3. Product Development Activities

Product development encompasses a broad range of activities, people, and processes from concept initiation to transition management. Critical decisions are made in each of these activities. The product development function is broken down into eight interconnected steps:

- I. **Initiate Concept:** Before initiating a product development process, the product concept is developed based on customer requirements and market needs. The key deliverable from this step is a product proposal linking the product features to projected sales. This task involves a "quick and dirty" marketplace assessment, preliminary technical assessment, and then a detailed market study.
- II. **Plan Portfolio:** As several product proposals are generated, the next task is to plan the entire portfolio of new product projects. Key questions that need to be answered include:
 - Which products should we have in development given our resources?
 - Which projects should we invest in to maximize the overall return?
 - Which projects meet the overall strategic objective of the company?
 - Which products will be launched and when?Chances are that given limited resources, the company will not be able to develop all the products that are proposed. Management often needs to make tough decisions and choose the best projects among several good options.
- III. **Plan Pipeline:** After selecting the projects that will be developed, the next critical task is to develop a plan to ensure that projects will flow smoothly through the development pipeline to hit their market windows.
 - How do we allocate the available resources to the appropriate projects?
 - Where are the bottlenecks in our development process?
 - How should we adjust our staffing and training plans today to meet future resource demands?
 - Should we outsource tasks or make changes (increase or decrease) to our resources?
- IV. **Project Management:** As the project moves along the development pipeline, proper scheduling and tracking of tasks are critical and essential.
 - What is the impact of schedule changes on other projects / overall profitability?
 - Is the project on track? Will we meet our timeline?
 - What part of the development is off track? How can we fix it?
- V. **Product Design:** Another key element of the product development function is to actually design the product. Prototypes of the products may be developed and the product is must be designed for "manufacturability". Use of design automation and CAD/CAM tools is a common practice.
- VI. **Production Process Design:** A key step for product development is to incorporate the production capabilities in the product design. After the design of the product is complete, some of the production-related questions that need to be answered include:
 - What is the optimal way to produce this product?
 - How do the various design changes impact the production cost?
 - Is there enough capacity to produce this product in-house? Should we outsource?
 - Do the appropriate capabilities exist in-house?
 - Who are the key suppliers that will contribute to the production of this product?
- VII. **Supplier Coordination:** Almost all products require parts, components, or sub-assemblies. Collaborating and coordinating with various suppliers is critical and essential. Given a condensed timeline, managing supplier expectations and deliverables is very important to ensure timely launch of the final product. Some of the decisions that are made here include:

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- Who are the key suppliers?
- Do the suppliers have the skills to meet our needs?
- How much of this design should be done by component suppliers?
- Is the supplier on track and how do the changes at the supplier's end affect the overall project?

VIII. Transition Management: As the product is launched, several critical decisions need to be made to ensure an effective launch.

- Who is/are the trial customer(s)?
- What is the actual launch plan? Is it a global launch? Regional launch?
- How do we replace the existing product without cannibalizing too much?
- How do we minimize waste and obsolescence of existing products?

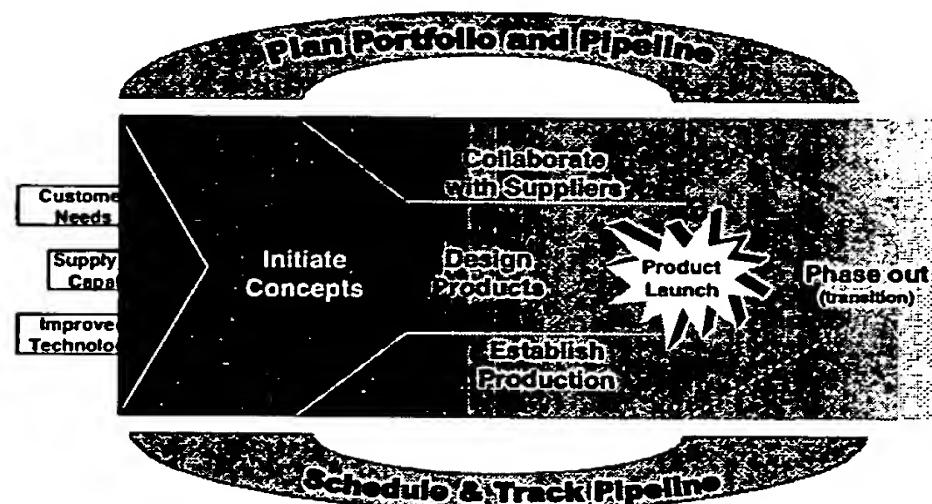


Figure 2 Product Development Activities

4. RHYTHM Product Development - i2's solution strategy

4.1 i2's Overall Product Development Strategy

i2's strategy is to provide a comprehensive and integrated suite of tools to support managers making tough decisions throughout the product development process. Managers make decisions by sorting through large amounts of information coming from diverse sources. With the increasing complexity of the product development process today, managers are faced with more difficult decisions and finding it hard to incorporate all the relevant information. Identifying various options, simulating several situations and making the right decision have become ever more challenging.

The RHYTHM Product Development solution suite is designed to make the decision-making process efficient and less cumbersome. RHYTHM Product Development is based on two basic principles – integration and technology.

Integration: RHYTHM Product Development integrates at two levels:

Across activities: Information across all product development activities and across the entire enterprise is integrated to ensure intelligent decision-making.

Across existing tools: RHYTHM Product Development is part of i2's RHYTHM suite and integrates seamlessly with most existing tools, including PDM, CAD/CAM, Project Management, and Enterprise Resource Planning systems.

Technology: i2 is the recognized leader in optimization and planning software and multi-enterprise collaboration software. RHYTHM Product Development incorporates these strengths for product development functions like portfolio and pipeline planning, scheduling and tracking, supplier coordination and collaboration, and launching / transitioning of products.

Furthermore, RHYTHM Product Development also incorporates state-of-the-art technology in other areas, including Computer Aided Design (CAD/CAM) and Product Data Management (PDM).

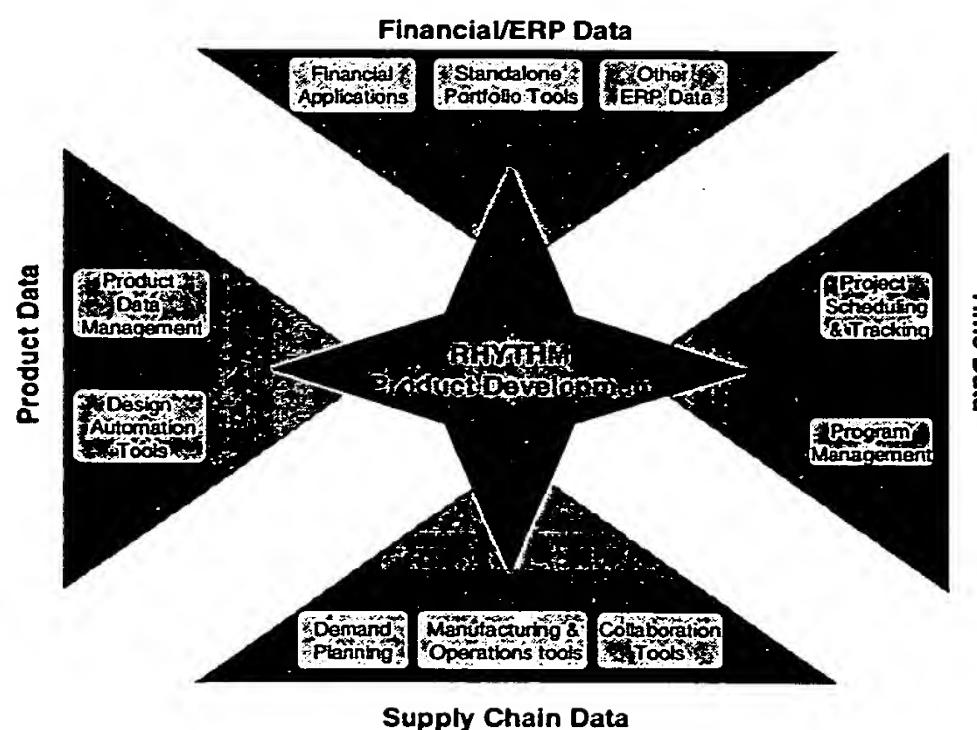


Figure 3. Integrated Product Development Solution

4.2 Decision Support through RHYTHM Product Development

In answering the following questions, RHYTHM Product Development suite is designed to provide managers with intelligent options through integrated visibility and optimization capabilities:

- How do we shorten the time-to-market for critical projects?
- Which projects and resources should we invest in?
- How do we prioritize projects in quickly changing business environment?
- What is the impact of design and scheduling changes on other projects and overall profitability?
- What is the impact of design changes on production capacity, margin and time-to-market needs?
- Which design option best leverages our supply chain capabilities?
- Do we make or buy the product/component?
- From whom should we source? When should we source?
- Which supplier should be selected based on their design lead-time and component cost?
- Do we have enough capacity to sustain projected demand?
- Do we have sufficient skills in-house for production?
- What is the impact of end-of-life decisions on inventory, capacity, and revenue?
- How do I transition from old to new product in the market?
- How do I reduce waste and manage cannibalization?

These are examples of some of the decisions that managers face as they manage the product development function. i2's RHYTHM Product Development suite provides decision support to the key users to help make these decisions. Using integrated visibility and optimization capabilities, RHYTHM Product Development provides support.

4.3 RHYTHM Product Development is Unique

Several tools currently in the marketplace address one or more specific product development activities. However, there is no comprehensive tool that provides decision support and incorporates all activities associated with product development. RHYTHM Product Development is truly unique since it is the only tool that provides optimization and decision support spanning the entire product life cycle.

RHYTHM Product Development allows managers and executives to evaluate "what-if" scenarios in real time – without initiating lengthy analytical activities. This ability to consider new options enables a development organization to make intelligent decisions in a highly fluid environment.

4.3.1 Enterprise-wide integration capabilities

Links to supply chain planning systems: The RHYTHM Product Development suite provides decision support based on actual supply chain capabilities so product decisions are made based on real capabilities of the supply chain. Once decisions are made, the RHYTHM Product Development can update supply chain planning systems to reflect the utilization of the supply chain.

Links to existing ERP systems: The RHYTHM Product Development suite accesses actual financial information from ERP systems so that financial analysis reflects up-to-date financial assumptions. It provides decision support to set realistic plans that can be entered into the execution and reporting capabilities of ERP systems. Once portfolio decisions are made, the RHYTHM Product Development solution can update financial assumptions in the ERP system.

Links to existing Project Management tools: RHYTHM Product Development links to the actual task dependency and duration of project management and project scheduling and tracking tools to ensure

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portfolio decisions are based on executable project schedules. Once projects have been authorized, i2's RHYTHM Product Development solutions can update the scheduling system to reflect the new demands on development resources.

Links to PDM and CAE: RHYTHM Product Development links to the product data of PDM to ensure portfolio decisions are made based on actual product configurations and costs. Once component alternatives have been evaluated, RHYTHM Product Development solution can update the PDM and CAE tools with the current product configuration.

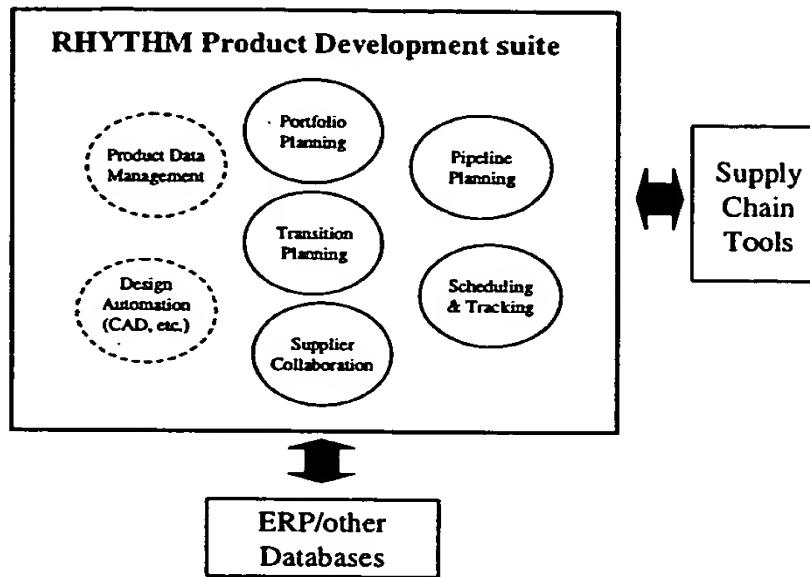


Figure 4. RHYTHM Product Development solution

4.3.2 RHYTHM Product Development is different from existing Project Management Tools

i2's RHYTHM Product Development offers significantly more traditional project management tools. Traditional project management tools are typically designed to schedule and track activities associated with product development. These activities are an essential component for overall product development and RHYTHM Product Development incorporates these activities as a part of its overall solution.

Typical project management questions answered using RHYTHM Product Development are:

- When must I complete the work on the next task?
- What are the dependent tasks that must be completed before I can begin the next task?
- Have we exceeded the budget for this portion of the project?
- Which projects are planning to use a specific individual and what is the schedule for that individual?
- What are the total resource requirements from a given functional area?
- When can we expect our three most important projects to reach a specific milestone?

The RHYTHM Product Development solution provides intelligent decision support for all product development activities.

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4.3 RHYTHM Product Development

4.3.3 RHYTHM Product Development versus Product Data Management (PDM) tools

i2's RHYTHM Product Development integrates with the existing PDM tools. The overall i2 solution incorporates all activities associated with PDM. Traditional PDM tools manage the details of specific design decisions. Typical questions answered by such tools are:

- What parts will I choose for my design?
- Which revisions impact my release of my product?
- Where is the documentation for my product?
- What is the approval status of my design?

The RHYTHM Product Development suite offers capability to make decisions across all activities associated with product development and integrates with major existing PDM tools to capitalize on their individual strengths.

4.3.4 RHYTHM Product Development is different from existing CAD/CAE tools

The RHYTHM Product Development suite integrates with most existing design automation tools. Computer Aided Engineering tools such as computer aided design (CAD), computer aided manufacturing (CAM), computer aided process planning (CAPP), electronic design automation (EDA), to name a few, are designed to assist engineers with automating the design process. Questions typically answered by these tools are:

- How do the various parts of the product fit together?
- How do we design the product without violating any design rules?
- How much machine time will be required to make this part?
- Will this product perform as desired?

RHYTHM Product Development leverages the strengths of existing CAE tools to provide integrated decision support across the entire product life cycle.

4.3.5 RHYTHM Product Development is different from existing Portfolio Analysis tools

RHYTHM Product Development includes portfolio analysis as one component of the overall product development solution. RHYTHM PD Planner is the intelligent decision-support tool that addresses all activities associated with portfolio analysis. In fact, RHYTHM PD Planner provides integrated portfolio and pipeline planning. (Please refer to separate documents outlining the functionality of RHYTHM PD Planner.)

5. Conclusion

RHYTHM Product Development is a comprehensive and integrated suite of software solutions designed to support optimal decision-making during product development. This is the only solution in the market that uses advanced planning and optimization tools to addresses the entire product life cycle— from concept, to launch, to phase out.

RHYTHM Product Development incorporates advanced optimization, planning, and collaborative technologies and integrates with existing enterprise-wide decision support and Enterprise Resource Planning (i.e. Transaction) systems. Using i2's advanced technology and integrating with all processes in the enterprise, the RHYTHM Product Development suite maximizes the effectiveness and efficiency of the product development process.